



Natural Resources Conservation Service
P.O. Box 2890
Washington, D.C. 20013

Weekly Report - Snowpack / Drought Monitor Update Date: 29 April 2010

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: SNOTEL Snow-Water Equivalent percent of normal values for 29 April 2010 shows some river basins with one bin class deterioration this week as would be expected during this time of year. However, a few basins are showing increases, due in part to the cooler than average temperatures that are slowing snow melt. Rapid melting of snowpack is also noted over central Arizona (Fig. 1a).

Temperature: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over the Wyoming Range in Western Wyoming ($+8^{\circ}\text{F}$) and the greatest negative departure occurred over southwest Arizona (-6F) (Fig. 2).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 28 April shows the bulk of the heaviest precipitation fell over northern Coastal California-southern Oregon and southeast Wyoming-northeast Colorado (Fig. 3). In terms of percent of normal, much of the West experienced two to four times the normal precipitation this week. Exceptions dominated over parts of the Northern Tier States and Utah-Arizona-New Mexico (Fig 3a). For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. Several river basins are within 2% of last week's percentages (Fig. 3b).

WESTERN DROUGHT STATUS

The West: The precipitation pattern was variable in the West this week, with 2-3 inches of precipitation falling in favored upslope areas of the California Sierra and Pacific Northwest coast, and 3+ inches reported in some coastal stations of Oregon and northern California and isolated areas in the Colorado and Wyoming mountains. Parts of the Pacific Northwest and northern intermountain basin received 1-2 inches of precipitation, but other large areas had only a few tenths of an inch. While total precipitation, by itself, reflected improving conditions, mountain snowpack and streamflow were below average in many areas, with spring and summer streamflow forecasts reflecting dire conditions. Reservoir levels were variable, with some near capacity (Washington and Idaho) while others were generally below normal (Oregon, Nevada, New Mexico, and Utah). In some river basins of the Pacific Northwest (the Upper Snake, for example), the lack of mountain snow has led to the water management decision to store more water, thus near capacity reservoirs.

As a result, very little change was made to the drought depiction in the West this week. D0 was pulled back in the Sacramento and San Joaquin Valleys of California. In Washington, D0 retreated in Kittitas county and D1 in Idaho's Butte-Jefferson-Madison-Bingham counties. D0(A) was expanded back into the Blaine-Phillips county area of Montana to reflect long-term precipitation deficits. April 25 USDA reports indicated that 19% of the pasture and rangeland and 9% of the winter wheat in Montana were in very poor to poor condition, with 31% of the topsoil moisture and 40% of the subsoil moisture very short to short. Those statistics were 16% (pasture and rangeland), 13% (topsoil moisture), and 26% (subsoil moisture) in Wyoming. Irrigation water supply was very poor to poor in 12% of Wyoming and 13% of Idaho. Author: Richard Heim, National Climatic Data Center, NOAA

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A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.

DROUGHT IMPACTS DEFINITIONS (<http://drought.unl.edu/dm/classify.htm>)

The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 4, and 4a).

SOIL MOISTURE

Soil moisture (Figs. 5a and 5b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria). Another good resource can be found at: <http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>.

U.S. HISTORICAL STREAMFLOW

http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map.

This map, (Fig. 6) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.

STATE ACTIVITIES

State government drought activities can be tracked at the following URL: <http://drought.unl.edu/mitigate/mitigate.htm>. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information - <http://www.wcc.nrcs.usda.gov/cgibin/bor.pl>. Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/> and <http://drought.gov>.

FOR MORE INFORMATION

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage - <http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ NOLLER HERBERT
Director, Conservation Engineering Division

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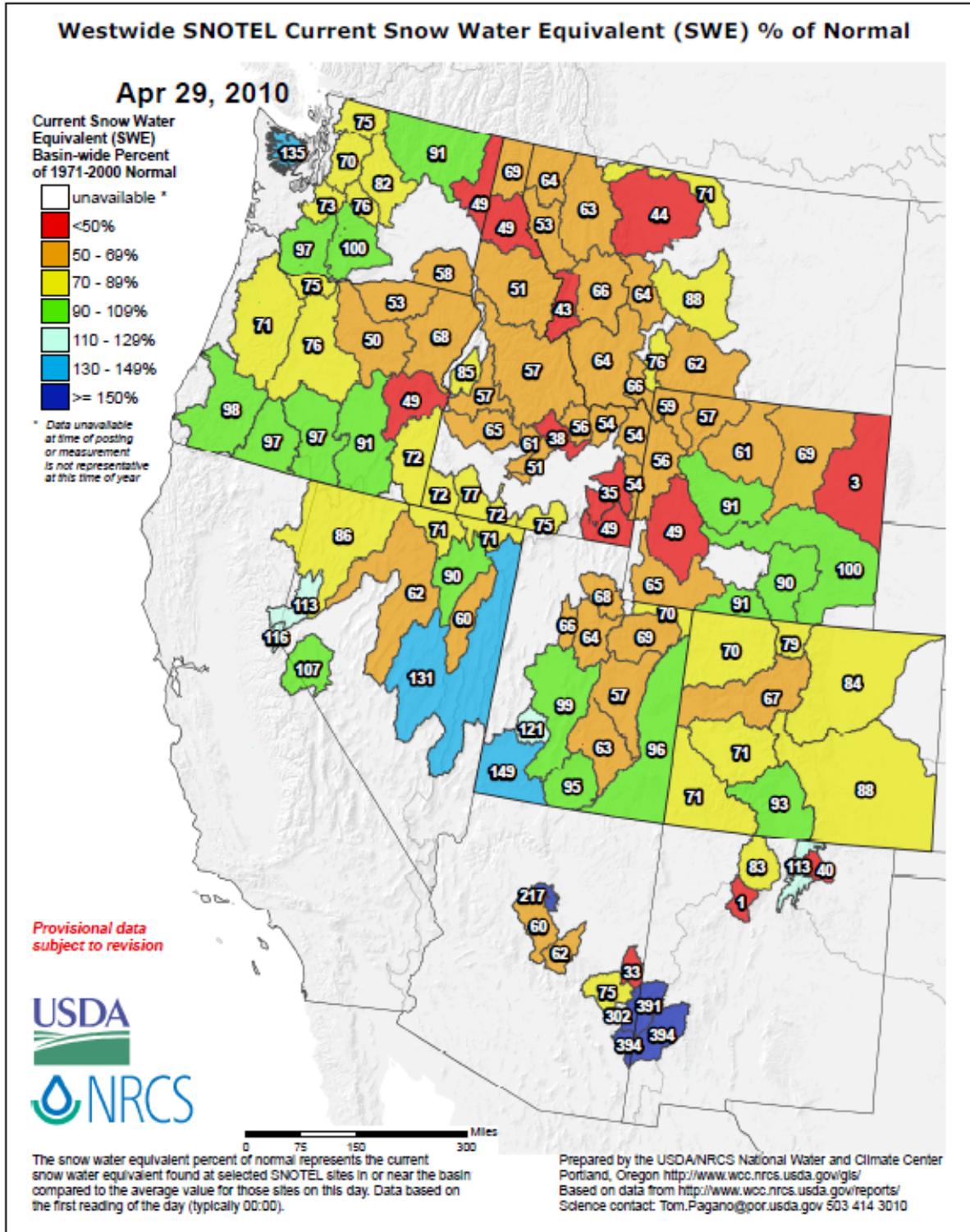


Fig. 1: SNOTEL Snow-Water Equivalent percent of normal values for 29 April 2010 shows some river basins with one bin class deterioration this week as would be expected during this time of year. However, a few basins are showing increases, due in part to the cooler than average temperatures that are slowing snow melt. Rapid melting of snowpack is also noted over central Arizona.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf

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SNOTEL 7-Day Snow Depth Change (Inches)

Apr 29, 2010

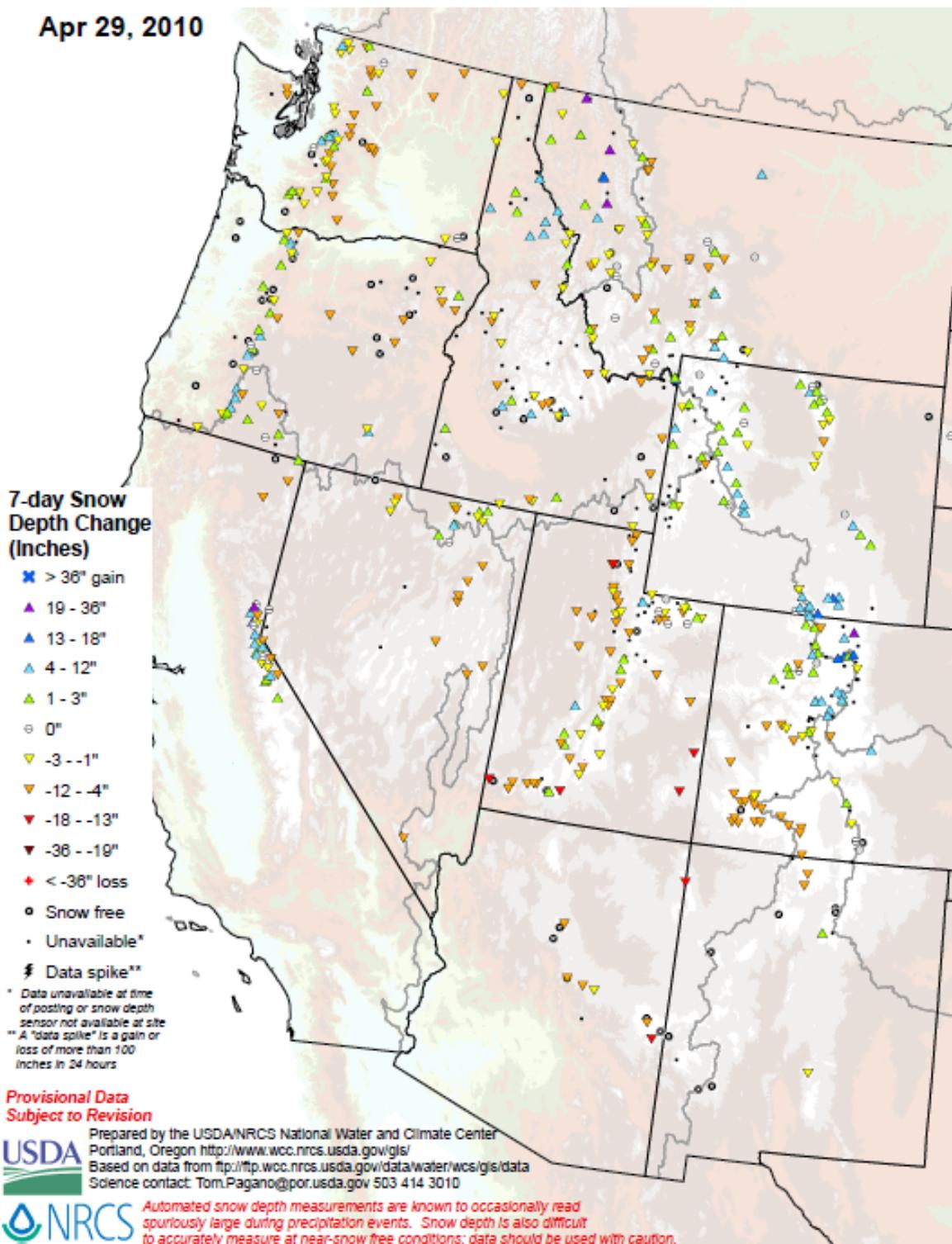
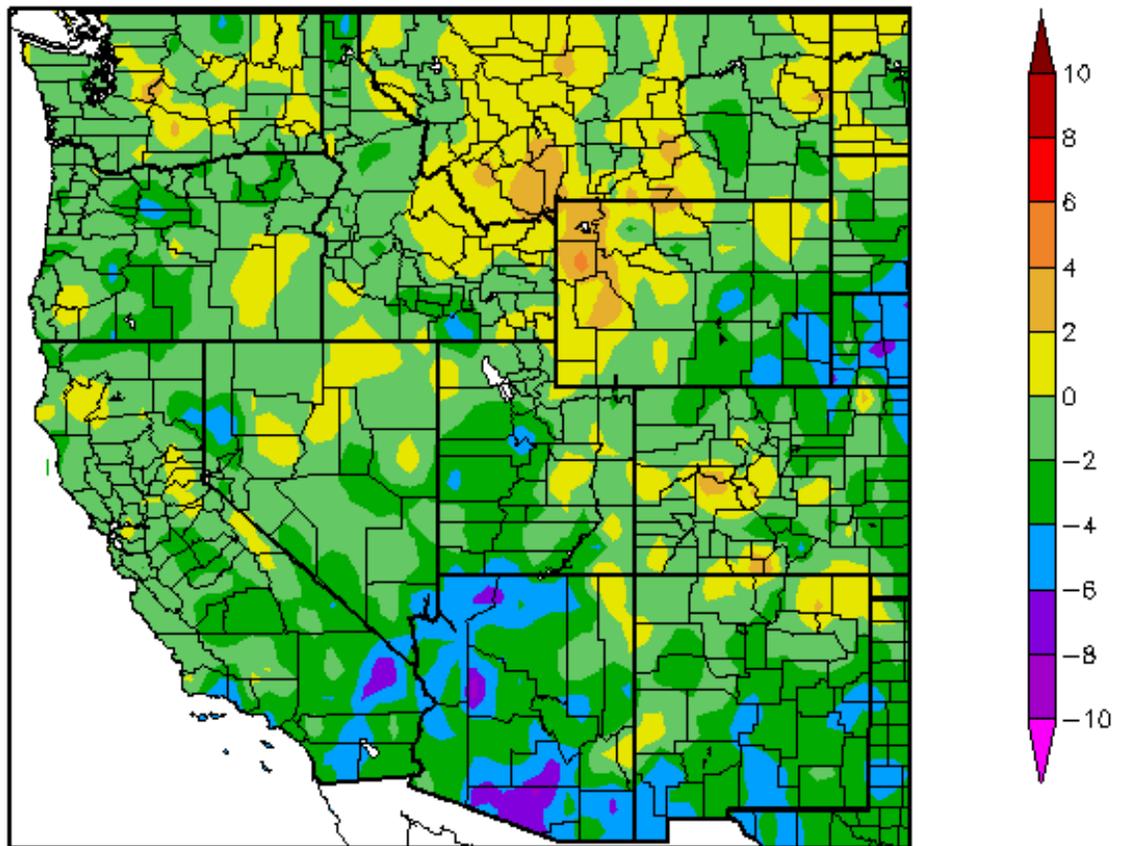


Fig. 1a: SNOTEL 7 day snow depth change reveals a mixed signal across the West. Some precipitation falling as snow combined with cooler temperatures has delayed seasonal melt out especially over the Colorado Rockies and Oregon Cascades.

Ref: http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf

Departure from Normal Temperature (F)
4/22/2010 – 4/28/2010



Generated 4/29/2010 at HPRCC using provisional data.

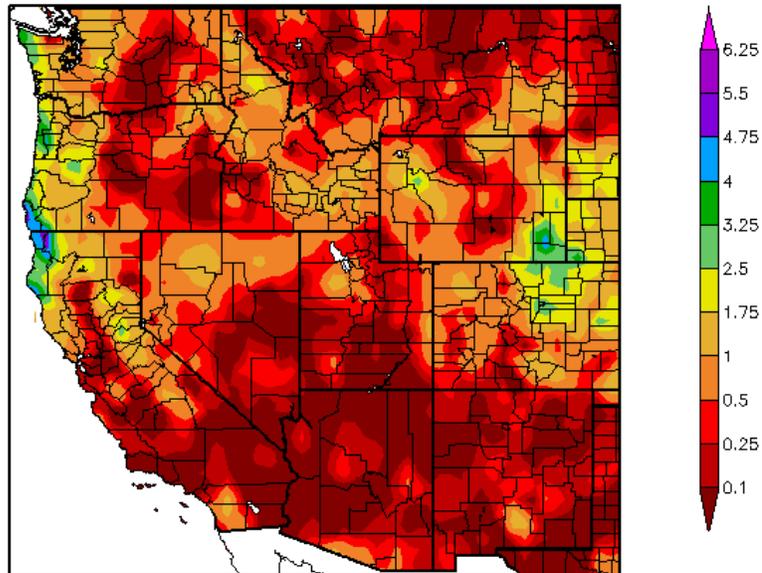
NOAA Regional Climate Centers

Fig. 2: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over the Wyoming Range in Western Wyoming (>+8°F) and the greatest negative departure occurred over southwest Arizona (<-6°F).

Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d

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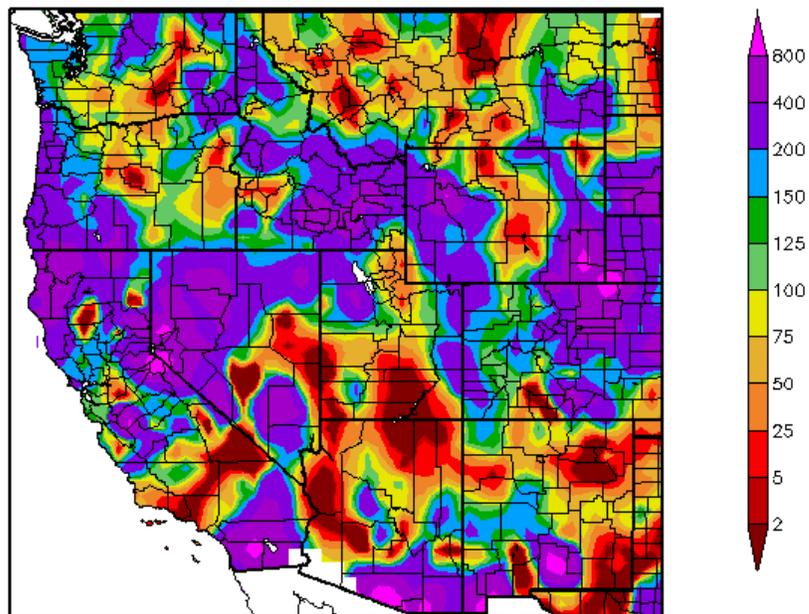
Precipitation (in)
4/22/2010 - 4/28/2010



Generated 4/29/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
4/22/2010 - 4/28/2010



Generated 4/29/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a: ACIS 7-day average precipitation amounts for the period ending 28 April shows the bulk of the heaviest precipitation fell over northern Coastal California-southern Oregon and southeast Wyoming-northeast Colorado. In terms of percent of normal, much of the West experienced two to four times the normal precipitation this week. Exceptions dominated over parts of the Northern Tier States and Utah-Arizona-New Mexico. Ref: <http://www.hprcc.unl.edu/maps/current/>

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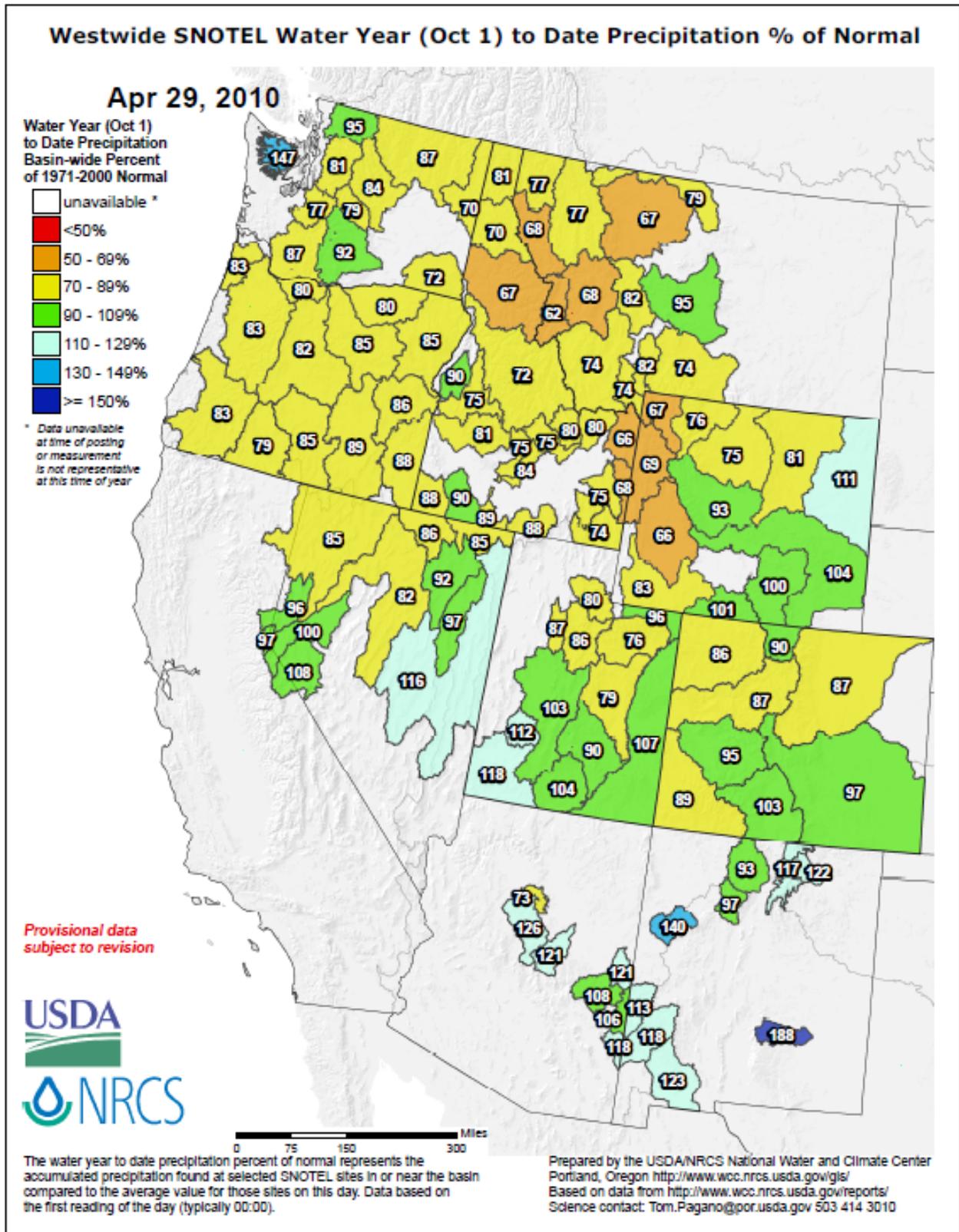
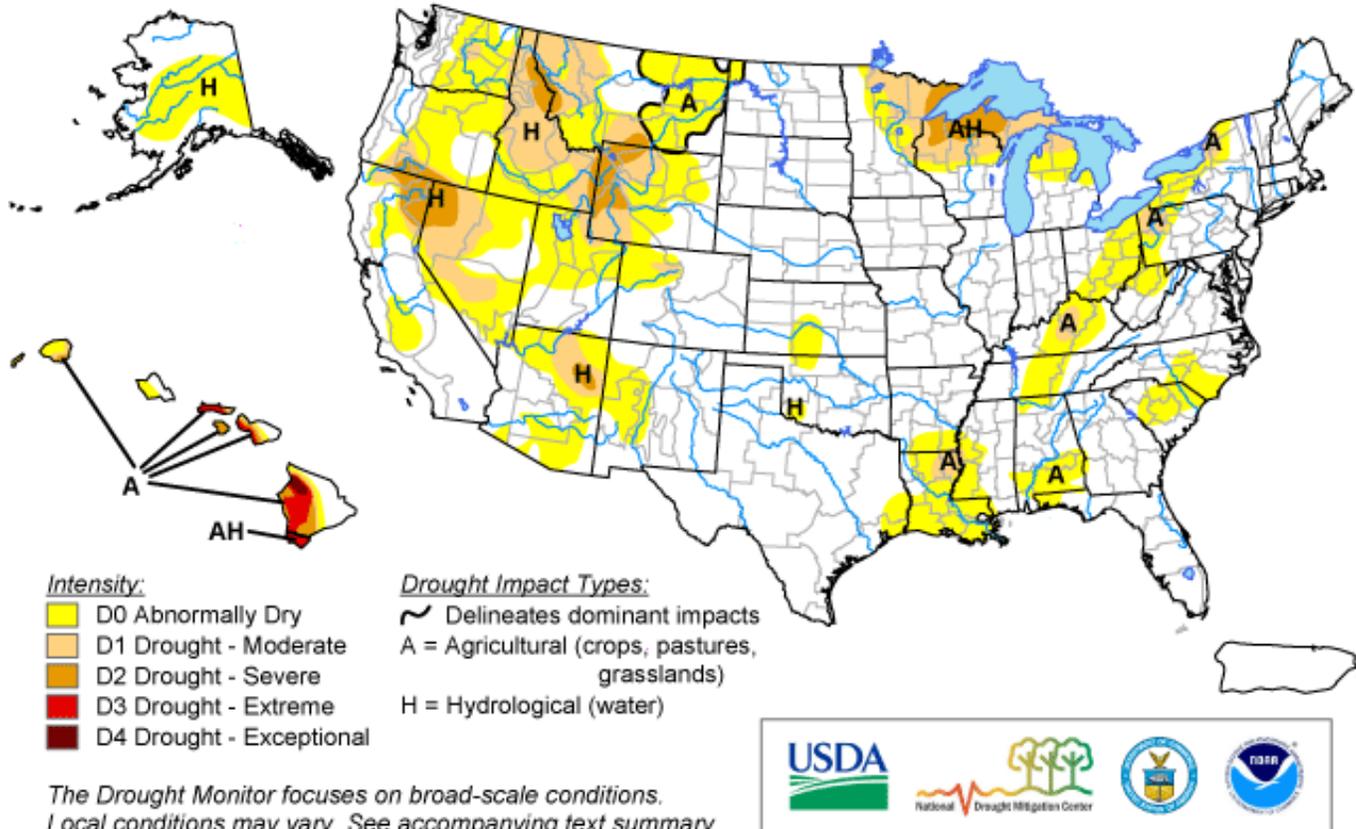


Fig 3b. For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. Several river basins are within 2% of last week's percentages.

Ref: http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecptnormal_update.pdf

U.S. Drought Monitor

April 27, 2010
Valid 8 a.m. EDT



Released Thursday, April 29, 2010

Author: Richard Heim/Liz Love-Brotak, NOAA/NESDIS/NCDC

<http://drought.unl.edu/dm>

Fig. 4. Current Drought Monitor weekly summary. Note Hawaii is the only state that is in D4 Drought.

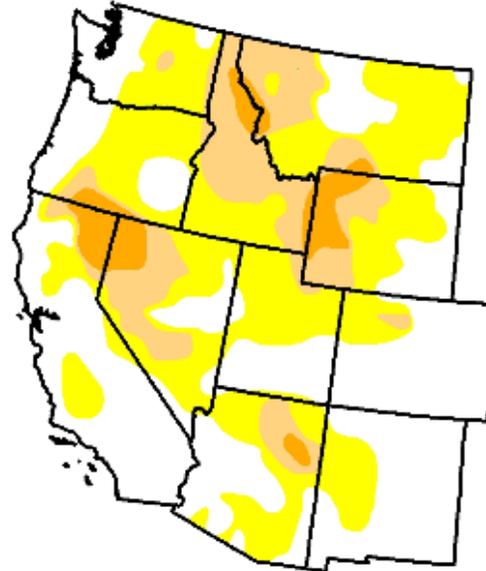
Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

U.S. Drought Monitor West

April 27, 2010
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	44.9	55.1	19.4	4.9	0.0	0.0
Last Week (04/20/2010 map)	44.9	55.1	19.7	4.9	0.0	0.0
3 Months Ago (02/02/2010 map)	38.7	61.3	19.2	3.3	0.0	0.0
Start of Calendar Year (01/05/2010 map)	40.1	59.9	30.6	9.9	0.5	0.0
Start of Water Year (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (04/28/2009 map)	33.6	66.4	25.2	7.7	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements



Released Thursday, April 29, 2010
Author: Richard Heim, NCDC/NOAA

<http://drought.unl.edu/dm>

Fig. 4a: Drought Monitor for the Western States with statistics over various time periods. Regionally there were no changes since last week.

Ref: http://www.drought.unl.edu/dm/DM_west.htm

Drought Monitor Classification Changes for Selected Time Periods

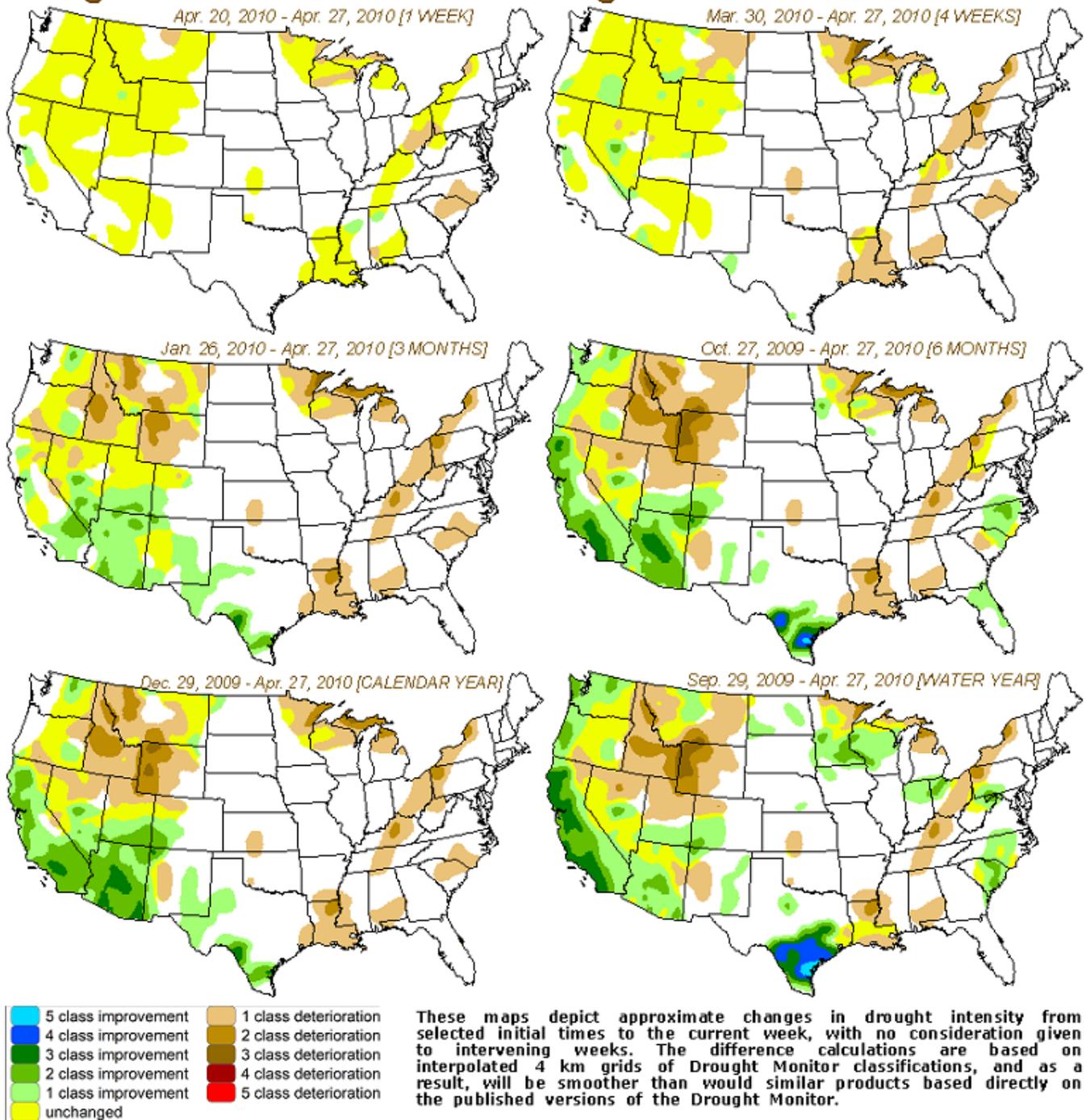
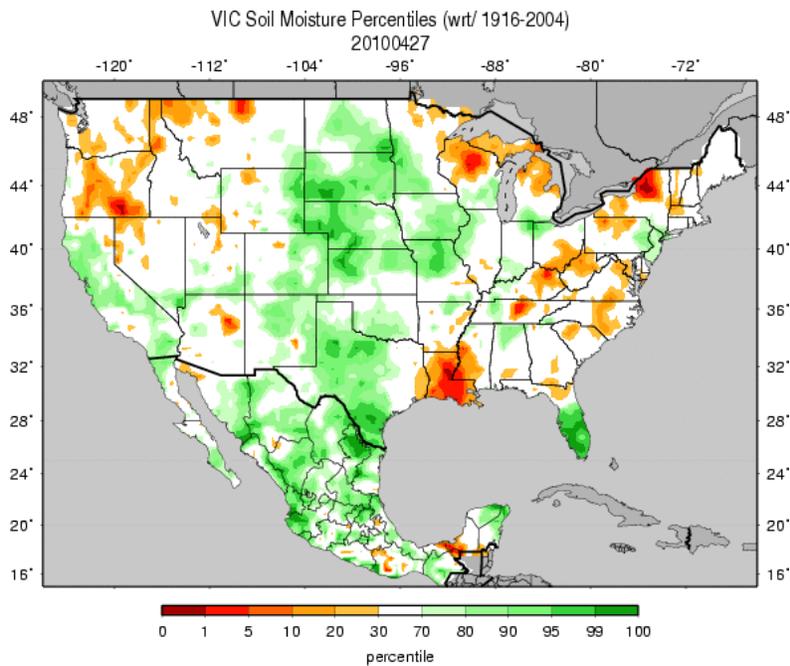


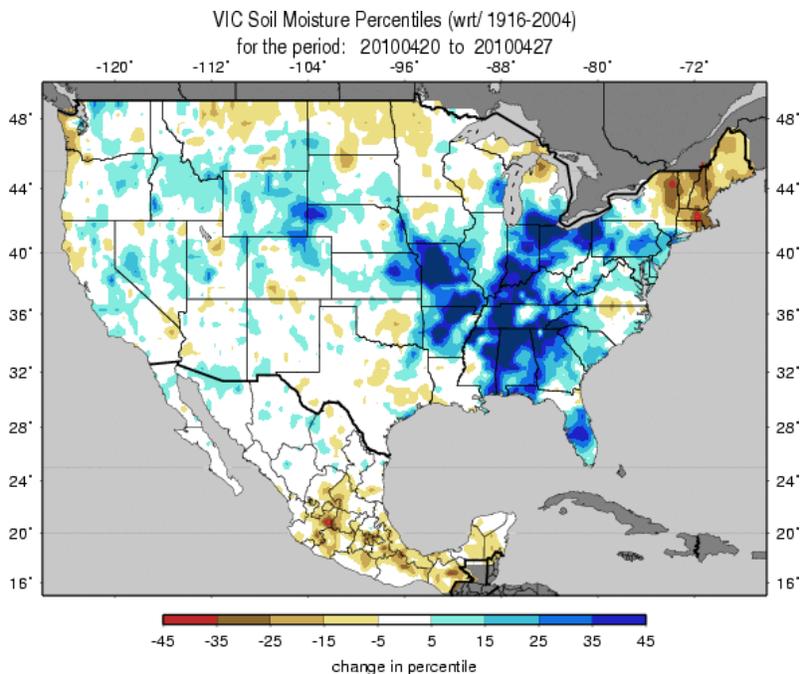
Fig. 4b: Drought Monitor classification changes for selected time periods reveals little change over the West during the past week but significant dryness over the Northern Rockies and Intermountain West during the 2010 Water Year. Note the abundant moisture (improvements) over Southern California and Arizona during 2010 as the influence of El Niño was very apparent.

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Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 27 April. Moisture patterns are the same as last week but the extreme dryness over the eastern third of the country is less intense.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif



Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for the week shows extreme moistening over the Mid-West and Colorado while drying dominates New England.

Ref: <http://www.emc.ncep.noaa.gov/mmb/nldas/drought/> (very useful resource) and http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif

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Wednesday, April 28, 2010

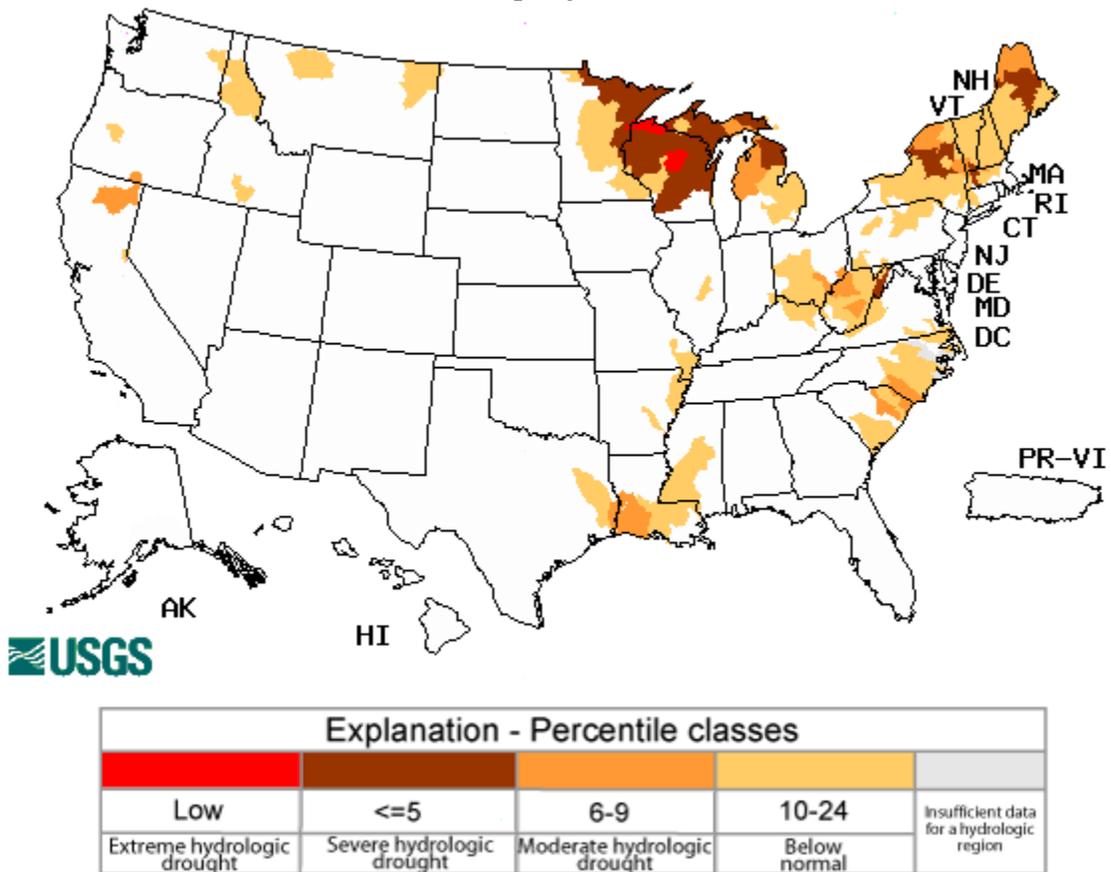


Fig. 6. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Significant worsening of conditions is noted over the northeastern New York, northern Maine, and the Northern Great lakes. However, a large portion of the Appalachians have improved this week. Conditions have also improved over the Pacific Northwest in part due to increased precipitation and cool temperatures.

Ref: <http://waterwatch.usgs.gov/?m=dryw&r>

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National Drought Summary -- April 27, 2010

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.

A Pacific cold front moved onto the West Coast early in the U.S. Drought Monitor (USDM) week. A large low pressure area developed with the front as the system moved across the country during the week. Pockets of above-normal precipitation fell across parts of the West, with widespread areas of 1-inch rain, and locally heavier amounts, in the central Plains and Southeast. The low moved into the Northeast by week's end, dropping enough rain in most areas to prevent expansion of drought, but not enough to contract the drought or abnormally dry areas. According to the U.S. Department of Agriculture (USDA), U.S. corn planting reached the halfway mark on the earliest date on record this year, with information available from 1974 to present. Fifty percent of the nation's corn was planted by April 25. The previous record for April 25 was 37 percent in 2004. While the dry weather of the last several weeks was beneficial for fieldwork and planting of crops in some Midwestern & northern locations (now), the A designator remained on the USDM map to indicate that continued dryness (into late May-June, for example) would become detrimental for crop emergence & establishment.

Great Lakes Region and Ohio Valley: Moderate rains (1 to 2.5 inches) fell over the abnormally dry (D0) area in northeast Ohio, but rainfall in the Ohio Valley to eastern Great Lakes D0 region was generally an inch or less. The cooler and wet weather limited evaporation, at least temporarily, and prevented expansion of the D0 and D1 (moderate drought) areas across most of the region, but the rain did little to alleviate long-term dryness. Even with the showers and thunderstorms, the week ended up drier than normal in many areas, especially in southeast Ohio to southwest Pennsylvania, where rainfall amounts of half an inch or less were widespread. Large precipitation deficits existed across much of the D0 area for the month-to-date back to 6 months ago ... even 12 months back in some areas. The area had very low soil moisture percentiles and near-record to record low USGS streamflow levels (7-, 14-, and 28-day averages), and short- and long-term indicators worsened. According to April 25 USDA reports, 44% of the topsoil in New York was very short to short, with those numbers 35% in West Virginia, 32% in Ohio, and 28% in Pennsylvania. In Kentucky, 21% of topsoil moisture and 34% of subsoil moisture were very short to short. Precipitation amounts were less than a tenth of an inch along the eastern shore of Lake Ontario, so a spot of D1(A) was added to the Watertown, New York, area where soil moisture deficits and Standardized Precipitation Index (SPI) values were most severe. D0 was introduced over southeast Ohio and environs to bridge the dry gap and join the D0 areas over Kentucky, West Virginia, northeast Ohio, and northwest Pennsylvania.

The D0-D2 area in the western Great Lakes was largely missed by this week's weather system. No precipitation fell at stations along the international border from Minnesota to Upper Michigan, and only a few tenths of an inch was observed at the southern stations of the D0-D2 area. Continuing significant precipitation deficits, record low streamflow, and extremely low soil moisture and drought indicator values resulted in the expansion of D2 (severe drought) in northern areas of Minnesota, Wisconsin, and Michigan and expansion of D0-D1 in those states. The last 90 days have been dry in southeastern Minnesota and adjacent parts of northern Iowa, but soil moisture conditions were near normal. The spring dryness and warmth following very wet fall and winter months there have resulted in favorable

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corn planting conditions. However, April 25 USDA reports indicated that, statewide, Wisconsin reported 37% of the soil moisture very short to short, Minnesota had 33% of topsoil moisture very short to short, and the statistics were 22% for topsoil moisture and 21% for subsoil moisture in Michigan. About 10% of the pasture and rangeland was in very poor to poor condition in those three states.

The Tennessee Valley, South, and southern Plains: D0 was pulled back in northern Alabama and north central Mississippi where locally 3+ inches of rain fell this week, and the northern nose of the D0 in southern Alabama was shaved. Locally 2-3 inches of rain fell in south central Kentucky, but it hardly made a dent in the long-term deficits, with dryness still widespread at 30+ days, so no change was made there. According to USDA reports, topsoil moisture conditions improved in some areas, with Alabama going from 53% of topsoil very short to short last week, to 23% this week. Topsoil moisture conditions also improved in Georgia (29%), Mississippi (17%), and South Carolina (36%), but deteriorated in Louisiana (47%) and Tennessee (35%). In Louisiana, 18% of the sugar cane crop was in very poor to poor condition, and 13% of pasture and range land.

The heavier rains this week missed the central Carolinas. Growing precipitation deficits (30 to 90 days), low streamflow and groundwater in some areas, and deteriorating short-term indicators prompted the introduction of an area of D0 across portions of central South Carolina to central and southeastern North Carolina. April 25 USDA reports indicated 25% of topsoil moisture in North Carolina very short to short, but significant progress made with wheat heading and corn planting. D0 was also expanded into southwestern Alabama where precipitation was light this week, long-term deficits significant, and streamflow below normal.

The western edge of the D0 in southwestern Oklahoma was trimmed where 1.5-2.0 inches of rain fell. But the D0(H) was otherwise kept in place to reflect irrigation concerns over the low level of Lake Altus-Lugert.

The West: The precipitation pattern was variable in the West this week, with 2-3 inches of precipitation falling in favored upslope areas of the California Sierra and Pacific Northwest coast, and 3+ inches reported in some coastal stations of Oregon and northern California and isolated areas in the Colorado and Wyoming mountains. Parts of the Pacific Northwest and northern intermountain basin received 1-2 inches of precipitation, but other large areas had only a few tenths of an inch. While total precipitation, by itself, reflected improving conditions, mountain snowpack and streamflow were below average in many areas, with spring and summer streamflow forecasts reflecting dire conditions. Reservoir levels were variable, with some near capacity (Washington and Idaho) while others were generally below normal (Oregon, Nevada, New Mexico, Utah). In some river basins of the Pacific Northwest (the Upper Snake, for example), the lack of mountain snow has led to the water management decision to store more water, thus near capacity reservoirs.

As a result, very little change was made to the drought depiction in the West this week. D0 was pulled back in the Sacramento and San Joaquin Valleys of California. In Washington, D0 retreated in Kittitas county and D1 in Idaho's Butte-Jefferson-Madison-Bingham counties. D0(A) was expanded back into the Blaine-Phillips county area of Montana to reflect long-term precipitation deficits. April 25 USDA reports indicated that 19% of the pasture and rangeland and 9% of the winter wheat in Montana were in very poor to poor condition, with 31% of the topsoil moisture and 40% of the subsoil moisture very short to short. Those statistics were 16% (pasture and rangeland), 13% (topsoil moisture), and 26% (subsoil moisture) in Wyoming. Irrigation water supply was very poor to poor in 12% of Wyoming and 13% of Idaho.

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Alaska, Hawaii, and Puerto Rico: Warmer- and drier-than-normal conditions characterized much of Alaska's weather this week, especially over the interior D0 region, with above-normal streamflow resulting from melt of the below-normal snowpack. No change in depiction was made. Abundant showers in drought-free Puerto Rico brought widespread rainfall reports of 2-5 inches, with locally heavier amounts, and above-normal streamflow.

In Hawaii, normal trade wind weather dominated throughout the week. Low rainfall totals were present across the State, with windward and mountain areas receiving most of the rain. According to the USDA, crops were in fair condition but required much irrigation. Pastures, especially in leeward areas, continued to deteriorate. Voluntary irrigation water use reductions remained in effect in Maui and Honolulu Counties. D1-D3 expanded eastward on Molokai, reflecting the worsening pasture conditions.

Looking Ahead: A series of low pressure and cold frontal systems will track across the U.S. during the next 2 weeks. For the first 5 days (April 29-May 3), widespread areas of half an inch or more of precipitation are expected across the Sierra Nevada to Pacific Coastal ranges, central and northern Rockies, and Upper Mississippi Valley. A large area of one inch or more of rain is forecasted from eastern Texas to Lake Erie, bringing much-needed relief to those eastern drought areas. Locally heavy rain (4 inches or more) may occur along the Mid-Mississippi to Tennessee valleys. Below-normal temperatures are expected underneath an upper trough over the western U.S. with warmer-than-normal temperatures in the southerly flow over the eastern half of the country.

For the 6 to 10-day outlooks (May 4-8), a continuation of wet weather is predicted for the region from eastern Texas to the Great Lakes, then eastward to the Mid-Atlantic Coast. Above-normal precipitation is also expected for Montana east of the divide and for the Mid-Pacific Coast. The outlook is for below-normal precipitation across most of Alaska and Florida, and from the intermountain basin to central Plains. Below-normal temperatures are expected along the northern States and eastern Alaska with above-normal temperatures across the southern tier States and western Alaska.

Author: [Richard Heim, National Climatic Data Center, NOAA](#)

Dryness Categories

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

Drought Intensity Categories

D1 ... Moderate Drought

D2 ... Severe Drought

D3 ... Extreme Drought

D4 ... Exceptional Drought

Drought or Dryness Types

A ... Agricultural

H ... Hydrological

Updated April 28, 2010